

## REMARKS

Claims 1, 2, and 4-54 are pending in the Application. Claims 12, 14, and 24-44 are withdrawn as being directed toward a non-elected species. In the Office Action, the Examiner rejects claims 1, 2, 4-11, 15-23 and 45-54 and objects to claim 13 as being dependent on a rejected claim, but indicates at page 6 of the Office Action that claim 13 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Each of the Examiner's rejections are discussed in turn below.

### Rejections Under 35 U.S.C. §102

At page 2 of the Office Action, the Examiner rejects claims 1, 2, 4-6, 10, 15, 17, 45, 47-52, and 54 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,363,867 to Tsilevich ("Tsilevich"). According to the Examiner, Tsilevich discloses an armor comprising a metallic material (e.g. Nitinol) that undergoes a reversible phase change between -50°C and 200°C, a second metallic plate, and a third metallic plate.

As discussed in M.P.E.P §2131.01, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference." M.P.E.P §2131.01, citing *Vedegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987).

Claim 1 recites, in pertinent part, "[a]n armor capable of withstanding penetration by a projectile impacting the armor, the armor comprising at least one layer of a metallic material that absorbs energy from the impacting projectile...." Similarly, claim 45 recites, in pertinent part, "[a]n article of manufacture including an armor capable of resisting penetration by a projectile impacting the armor, the armor comprising at least one layer of a metallic material that absorbs energy from the impacting projectile...."

Applicant submits that Tsilevich, neither expressly nor inherently, teaches an armor capable of withstanding or resisting penetration by a projectile impacting the armor and which comprises at least one layer of a metallic material

that absorbs energy from the impacting projectile. Accordingly, Applicant asserts that Tsilevich does not anticipate either claim 1 or claim 45.

At col. 1, lines 44-54, Tsilevich discloses that the mechanism by which penetration is resisted by the barrier system taught therein is by “mechanically trapping the foreign object,” and more specifically, “automatically applying a lateral compressive force to the burglary tool, thereby trapping the burglary tool.” Thus, in contrast to the armor set forth in claims 1 and 45 of the Application, Tsilevich discloses a barrier system that is effective in *mechanically trapping* a burglary tool by “applying a primarily lateral compressive force on said burglary tool substantially perpendicular to a direction of travel of the burglary tool....” Tsilevich at col. 5, lines 8-11 (claim 1). Accordingly, Tsilevich does not teach an armor comprising at least one layer of a metallic material that *absorbs energy from an impacting projectile* as required by claim 1 and 45.

Moreover, as evident in claims 1 and 19 of Tsilevich, Tsilevich is directed toward an anti-intrusion barrier system that resists penetration by “non-projectile burglary tools.” Accordingly, Tsilevich does not disclose an armor comprising at least one layer of a metallic material that absorbs energy from *an impacting projectile* as required by claims 1 and 45.

Therefore, since Tsilevich fails to describe every element in claim 1 or claim 45, either expressly or inherently, Applicant respectfully submits that Tsilevich does not anticipate either claim 1 or claim 45 of the Application. Further, Applicant submits that Tsilevich, either alone or in combination with the other references cited by the Examiner, fails to teach or suggest all of the limitations of claim 1 or claim 45. Accordingly, Applicant asserts that claim 1 and claim 45 are patentable over Tsilevich, whether taken alone or in combination with the other references cited by the Examiner.

Moreover, since claims 2, 4-6, 10, 15, and 17 depend from claim 1 and therefore contain all of the limitations of claim 1, at least for the reasons cited above with respect to claim 1, Applicant submits that claims 2, 4-6, 10, 15, and 17 are also not anticipated by and are patentable over Tsilevich, whether taken alone or in combination with the reference cited by the Examiner.

For the additional reason set forth below, Applicant further asserts that Tsilevich neither expressly or inherently discloses an armor as set forth in claim 10. Claim 10 recites, in part, "...the first layer is a first *plate*...". (Emphasis added). The Examiner has indicated in the Office Action that the "first layer" as disclosed in Tsilevich is the *zigzag strip* of a shape memory alloy shown in Fig. 2 as 22 and Fig. 3 as 37. However, one skilled in the art would appreciate that the zigzag strip shown and described in Tsilevich is substantially different from a plate. For example, as set forth in Webster's Ninth New Collegiate Dictionary, Merriam-Webster Inc., Springfield, MA (1983) at page 901, a "plate" in the context of armor is "one of the broad metal pieces used in armor." Further, more generally in the context of metallurgy, a "plate" is "a flat-rolled metal product of some minimum thickness and width arbitrarily dependent on the type of metal." ASM Materials Engineering Dictionary, J.R. Davis, Ed., ASM International, Metals Park, OH (1992) at page 322.

Therefore, since Tsilevich neither expressly nor inherently discloses an armor wherein the first layer is a *plate* as required by claim 10, Applicant submits that Tsilevich does not anticipate claim 10. Further, Applicant submits that Tsilevich, either alone or in combination with reference cited by the Examiner, fails to teach or suggest an armor as set forth in claim 10. Accordingly, Applicant asserts that claim 10 is patentable over Tsilevich, either alone or in combination with the other references cited by the Examiner. Moreover, since claims 15 and 17 depend from claim 10, and therefore include all of the limitations of claim 10, at least for the reasons set forth above, Applicant further asserts that claims 15 and 17 are also patentable over Tsilevich, whether taken alone or in combination with the other references cited by the Examiner.

Claim 47 recites, in pertinent part, "[a] method of absorbing energy from a projectile, the method comprising forming an armor comprising at least one layer of a metallic material that absorbs energy from the projectile impacting the armor...." As discussed above with respect to claims 1 and 45, Tsilevich does not teach or suggest an armor that absorbs energy from a impacting projectile. Instead, the barrier in Tsilevich acts as a *mechanical trap* for a burglary tool by

applying lateral compressive force to the tool. Although Tsilevich does suggest that the zigzag strip can absorb causing it to undergo a transition, the energy being absorbed is *not energy from a projectile impacting the strip, but instead an external heating source*. See Tsilevich at col. 2, line 66 through col. 3, line 8.

Accordingly, Applicant asserts that Tsilevich neither expressly nor inherently discloses a method of absorbing energy from a projectile as claimed in claim 47, and consequently, is not anticipated by Tsilevich. Further, Applicant asserts that claim 47 is patentable over Tsilevich, either alone or in combination with the other references cited by the Examiner. Additionally, since claims 48 and 49 depend from claim 47, at least for the reasons set forth above with respect to claim 47, Applicant asserts that claims 48 and 49 are not anticipated by Tsilevich, and are patentable over Tsilevich, whether taken alone or in combination with the other references cited by the Examiner.

Claim 50 recites, in pertinent part, “[a] method of protecting an article of manufacture against penetration from an impacting projectile, the method comprising applying to the article of manufacture an armor capable of withstanding penetration from the impacting projectile, the armor comprising at least one layer of a metallic material that absorbs energy from the projectile impacting the armor....”

As discussed above with respect to claims 1 and 45, Tsilevich does not teach or disclose a method of protecting an article of manufacture against penetration from *an impacting projectile*. Instead, Tsilevich is directed toward barriers that resist penetration by *a non-projectile burglary tool*.

Further, as discussed above with respect to claims 1 and 45, Tsilevich neither teaches nor discloses an armor comprising *at least one layer of a metallic material that absorbs energy from the projectile impacting the armor*. Instead, the barrier in Tsilevich resists penetration by *mechanically trapping* a non-projectile burglary tool by applying lateral compressive force to the tool.

Still further, Tsilevich does not disclose *a method of protecting an article of manufacture against penetration*. As discussed at col. 1, line 66 through col. 2, line 6 of Tsilevich, the barriers disclosed therein may be used, for example, as

bars of a prison cell, or alternatively, may be "included in a wall." However, because the barrier of Tsilevich works by mechanically trapping an instrument on penetration, the wall must be at least partially penetrated by the instrument before it can be trapped by the barrier. Thus, Tsilevich does not disclose a method of *protecting an article of manufacture against penetration*, whether by a projectile or a non-projectile instrument.

Accordingly, Applicant submits that Tsilevich neither expressly nor inherently discloses all of the elements of claim 50 and therefore, does not anticipate claim 50 or claims 51, 52, and 54 that depend therefrom. Further, Applicant submits that Tsilevich, either alone or in combination with the other references cited by the Examiner, fails to teach or suggest every element of claim 50 and that claim 50 (and claims 51, 52, and 54 that depend therefrom) are patentable over Tsilevich, whether taken alone or in combination with the other references cited by the Examiner.

In view of the foregoing, Applicant respectfully requests that the Examiner reconsider and withdraw his rejection of claims 1, 2, 4-6, 10, 15, 17, 45, 47-52, and 54 as being anticipated by Tsilevich under 35 U.S.C. §102(e), and allow the same.

At page 3 of the Office Action, the Examiner rejects claims 1, 2, 4-6, 9, 10, 15, 17, 45, 47-52, and 54 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,614,305 to Paine et al. ("Paine et al."). According to the Examiner, Paine et al. discloses an armor comprising a metallic material (e.g. Nitinol) that undergoes a reversible phase change between -50°C and 200°C, a second absorbing layer that exhibits an elastic strain deformation of at least 5%, a second plate, and a third plate.

As previously discussed "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference." M.P.E.P §2131.01, citing *Vedegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987).

Claim 1 recites, in pertinent part and with emphasis added, "[a]n armor capable of withstanding penetration by a projectile impacting the armor, the

armor comprising *at least one layer of a metallic material* that absorbs energy from the impacting projectile....” Similarly, claim 45 recites, in pertinent part and with emphasis added, “[a]n article of manufacture including an armor capable of resisting penetration by a projectile impacting the armor, the armor comprising *at least one layer of a metallic material* that absorbs energy from the impacting projectile....” Claims 47 and 50 similarly recite “an armor comprising *at least one layer of a metallic material* that absorbs energy....”

Paine et al. is directed toward a *polymeric composite material* that includes fibers of a material that exhibits a martensite phase transformation. See Paine et al. at Abstract and col. 2, lines 33-36. That is, the “layers” disclosed in Paine et al. are actually plies of a polymeric composite material that includes metallic fiber reinforcements, and not layers of a metallic material as set forth in the claims as discussed above. See e.g. Paine et al. at Abstract and Example 1. Further, as set forth at col. 4, lines 11-14 of Paine et al., preferably the composites disclosed there contain no more than 20% by volume of the metal fibers, and more preferably contain from 1-4% by volume of the metal fibers. Thus, it can be seen that, on a volume percent basis, the “layers” in Paine et al. *are composed primarily of a polymeric material*, and not a metallic material.

For the foregoing reasons, Applicant respectfully asserts that Paine et al. neither expressly nor inherently discloses every element of claims 1, 45, 47, and 50 and the claims that depend therefrom. Further, Applicant asserts that Paine et al., either alone or in combination with the other references cited by the Examiner, does not teach or suggest all of the limitations of these claims. Therefore, Applicant respectfully requests that the Examiner reconsider and withdraw his rejection of claims 1, 2, 4-6, 9, 10, 15, 17, 45, 47-52 and 54 as being anticipated by Paine et al. under 35 U.S.C. §102(b), and allow the same.

#### Rejections Under 35 U.S.C. §103

At page 3 of the Office Action, the Examiner rejects claim 46 under 35 U.S.C. §103(a) as being unpatentable over Paine et al. in view of U.S. Patent No. 5,370, 034 to Turner et al. (“Turner et al.”). According to the Examiner, Paine et

al. is applied as discussed above, however, Paine et al. does not disclose an armor article disposed on an armored vehicle. However, according to the Examiner, Turner et al. teaches an armor article disposed on an armored vehicle and, in view of Turner et al., it would have been obvious to a person of ordinary skill in the art to apply the teachings of Paine et al. to have an armor arrangement disposed on an armored vehicle.

As discussed in M.P.E.P §2143.03, “[t]o establish *prima facie* obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art.” *In re Royka*, 490 F.2d 981 (CCPA 1974).

Claim 46 depends from claim 45, which recites in pertinent part, “armor comprising at least one layer of a metallic material that absorbs energy from the impacting projectile and is selected from a metallic material that undergoes a reversible phase change upon absorbing energy and a metallic material that exhibits an elastic strain deformation of at least 5%.” However, as discussed above, Paine et al. does not teach or disclose an armor having at least one layer of a metallic material as set forth in claim 45. Instead, Paine et al. discloses plys of a polymeric composite including metallic fibers of a SMA.

Since claim 46 depends from claim 45, it contains all of the limitations of claim 45. Further, since all of the limitations of claim 45 are not taught or suggested by Paine et al., either alone or in combination with Turner et al., Applicant asserts that the Examiner has not established a *prima facie* case of obviousness of claim 46 based on the cited combination of references. Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw his rejection of claim 46, and allow the same.

At page 4 of the Office Action, the Examiner rejects claim 16 under 35 U.S.C. §103(a) as being unpatentable over Paine et al. in view of U.S. Patent No. 6,357,332 to Vecchio (“Vecchio”). According to the Examiner, Paine et al. is applied as discussed above, but Paine et al. does not disclose diffusion bonding to hold together adjacent layers. According to the Examiner, Vecchio teaches diffusion bonding to hold together adjacent layers. Further, the Examiner asserts that the Applicant is selecting a known method for holding together adjacent

armor layers and putting it to use as it is already commonly used in the art, and therefore, it would have been obvious to a person of ordinary skill in the art to apply the teachings of Vecchio to Paine et al.

Claim 16 indirectly depends from claim 1 and, therefore, contains all of the limitations of claim 1. As previously discussed, Paine et al. does not disclose all of the limitations of claim 1. In particular, Paine et al. does not disclose an armor comprising at least one layer of a metallic material as set forth in claim 1. Since all of the limitations of base claim 1 are not taught or suggested by Paine et al., either alone or in combination with Vecchio, Applicant asserts that the Examiner has not established a *prima facie* case of obviousness of claim 16 based on the cited combination of references. Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw his rejection of claim 16, and allow the same.

At page 4 of the Office Action, the Examiner rejects claims 11 and 18 under 35 U.S.C. §103(a) as being unpatentable over Tsilevich in view of U.S. Patent No. 5,654,518 to Dobbs ("Dobbs"). According to the Examiner, Tsilevich is applied as discussed above, however, Tsilevich does not disclose outer layers formed from alpha-beta titanium alloys. However, the Examiner asserts that Dobbs supplies this deficiency in disclosing outer layers that are alpha-beta titanium alloys. Further, the Examiner asserts that it would have been obvious for one skilled in the art to substitute one well known metallic armor element for another.

Claims 11 and 18 indirectly depend from claim 1 and therefore include all of the limitations of claim 1. Further, as discussed above with respect to the Examiner's rejection of claim 1 over Tsilevich, Tsilevich does not teach or suggest all of the limitations of claim 1. More specifically, Tsilevich fails to disclose or suggest an armor comprising at least one layer of a metallic material that absorbs energy from an impacting projectile as set forth in claim 1. Since the Examiner has not indicated how each and every limitation of the rejected claims is supplied by Tsilevich, either alone or in combination with Dobbs, Applicant submits that the Examiner has not established a *prima facie* case of



obviousness based on Tsilevich in view of Dobbs. Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw his rejection of claims 11 and 18 and allow the same.

At page 5 of the Office Action, the Examiner rejects claims 7, 8, and 53 under 35 U.S.C. §103(a) as being unpatentable over Tsilevich in view of Jackson et al., "55-Nitinol- The Alloy with a Memory: Its Physical Metallurgy, Properties, and Applications," NASA-SP 5110, National Aeronautics and Space Administration, Washington, D.C. (1972) ("Jackson et al.") or Buehler et al., "55-Nitinol Unique Wire Alloy with a Memory," Wire Journal, pp. 41-49 (June 1969) ("Buehler et al."). According to the Examiner, Tsilevich is applied as previously discussed, however, Tsilevich does not provide a Nitinol shape memory alloy that is 55-Nitinol. However, according to the Examiner, both Jackson et al. and Buehler et al. teach the use of a Nitinol shape memory alloy. Further, according to the Examiner, it would have been obvious for one skilled in the art to substitute one Nitinol shape memory alloy for another shape memory alloy.

Claims 7 and 8 depend from claim 1 and claim 53 depends from claim 50. As discussed above with respect to the Examiner's rejection of claims 1 and 50 over Tsilevich, Tsilevich does not disclose all of the limitations of the base claims from which claims 7, 8, and 53 depend. Since the Examiner has not indicated how each and every limitation of the rejected claims is supplied by Tsilevich, either alone or in combination with Jackson et al. or Buehler et al., Applicant submits that the Examiner has not established a *prima facie* case of obviousness based on Tsilevich in view of Jackson et al. or Buehler et al. Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw his rejection of claims 7, 8, and 53 and allow the same.

At page 5 of the Office Action, the Examiner rejects claim 19-23 under 35 U.S.C. §103(a) as being unpatentable over Tsilevich in view of Jackson et al. or Buehler et al, and Dobbs. According to the Examiner, Tsilevich, Jackson et al. and Buehler et al. are applied as discussed above, however, these references do not disclose alpha-beta titanium alloy outer layers. The Examiner asserts that this deficiency is supplied by Dobbs. Further, according to the Examiner, it would

have been obvious for one skilled in the art to apply the teachings of Dobbs to the combination of Tsilevich and Jackson et al. or Buehler et al. to provide an armor having alpha-beta titanium alloy outer layers.

Claims 19-23 indirectly depend from claim 1 and therefore include all of the limitations of claim 1. As discussed above, Tsilevich fails to disclose all of the limitations of claim 1. Since the Examiner has not indicated how each and every limitation of the rejected claims is supplied by Tsilevich, either alone or in combination with Jackson et al. or Buehler et al., and in further combination with Dobbs, Applicant submits that the Examiner has not established a *prima facie* case of obviousness based on this combination of references. Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw his rejection of claims 19-23 and allow the same.

At page 6 of the Office Action, the Examiner rejects claims 7, 8, and 53 under 35 U.S.C. §103(a) as being unpatentable over Paine et al. in view of Jackson et al. or Buehler et al. According to the Examiner, Paine et al. is applied as previously discussed, however, Paine et al. does not disclose a Nitinol shape memory alloy that is 55-Nitinol. However, according to the Examiner, both Jackson et al. and Buehler et al. teach the use of a Nitinol shape memory alloy. Further, according to the Examiner, it would have been obvious for one skilled in the art to substitute one Nitinol shape memory alloy for another shape memory alloy.

As previously discussed, claims 7 and 8 depend from claim 1 and claim 53 depends from claim 50. As discussed above with respect to the Examiner's rejection of claims 1 and 50 over Paine et al., Paine et al. fails to teach each and every limitation of these claims. Since the Examiner has not indicated how each and every limitation of the rejected claims is supplied by Paine et al., either alone or in combination with Jackson et al. or Buehler et al., Applicant submits that the Examiner has not established a *prima facie* case of obviousness based on this combination of references. Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw his rejection of claims 7, 8, and 53 and allow the same.

Objection

At page 6 of the Office Action, the Examiner objects to claim 13 as being dependent upon a rejected claim. Claim 13 depends from claim 11, which in turn depends from claim 10, which in turn depends from claim 2, which in turn depends from claim 1. For the reasons set forth above, Applicant submits that claims each of claims 1, 2, 10, and 11 are patentable over the references cited by the Examiner. Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw his objection to claim 13 and allow the same.

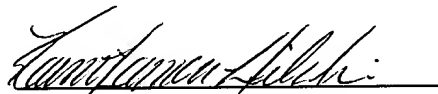
CONCLUSION

For the reasons set forth above, Applicant submits that the claims pending in the Application are patentable over the references cited by the Examiner. Accordingly, Applicant requests that the Examiner reconsider and allow claims 1, 2, 4-11, 15-23, and 45-54.

Additionally, as indicated in the Office Action issued by the Examiner on July 15, 2003, upon allowance of a generic claim, the Applicant is entitled to consideration of claims to additional, non-elected species that are written in dependent form or otherwise include all the limitations of an allowed generic claim. Applicant submits that claims 1, 47, and 50 are generic claims that are in a condition for allowance by the Examiner. Accordingly, since each of the non-elected species are embraced by an allowable generic claim, Applicant requests that the Examiner withdraw his restriction requirement as to the encompassed species and consider the claims drawn to the non-elected species.

Should the Examiner have any questions regarding the foregoing, the Examiner is requested to contact the undersigned.

Respectfully Submitted,

  
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